

CNS-6201/6801

2nd Generation Central Monitor Bedside Monitoring & Telemetry Applications

Clinical Reference Guide

Version 05-10+, 02-10+

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Basic Operation

Basic Operation on the ALL BEDS screen

Individual function keys

Displays the windows which are preset on the System Setup screen. Touch (▶) on each bed to display the Individual function keys. Touch (◀) to close the Individual function keys.



Menu



Data area (Patient Information Tile) Touch the tile to display the individual bed window.

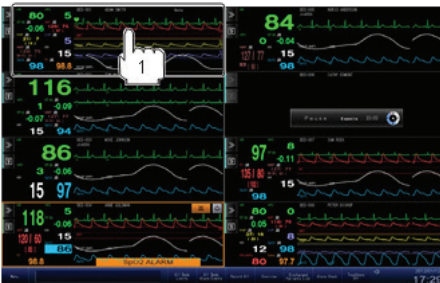


All beds function

Drag and Drop

On the ALL BEDS screen:

- Touch and hold the desired patient tile for 3 seconds.
- Drag the tile to the desired location on the ALL BEDS screen.

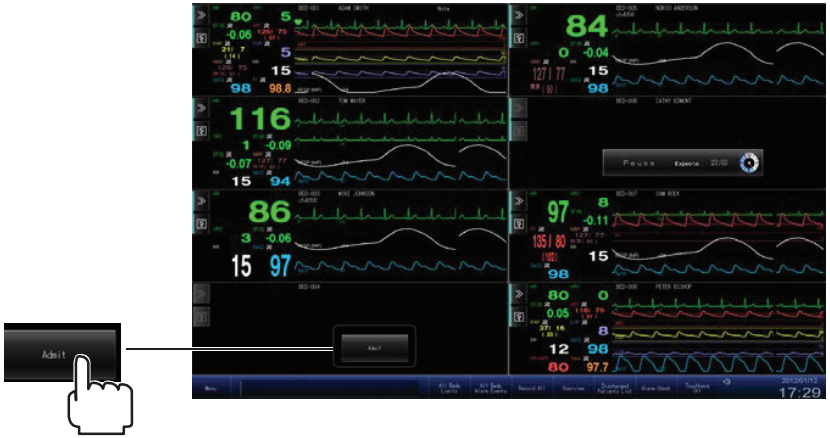


Admit/Readmit/Change Device/Pause/Transfer/Discharge



****Touch ALL BEDS key to exit any menu**

Patient Admission - Enter Patient Information

1. Touch ADMIT on the All Beds screen. The ADMIT/DISCHARGE window is displayed.



You can also display the ADMIT/DISCHARGE window by the following procedures.

- Touch ADMIT/DISCHARGE on the Individual Bed window.
- Touch () to display the Setup Menu. Touch ADMIT/DISCHARGE.
- Touch () on the ALL BEDS Screen. Touch ADMIT/DISCHARGE.

Telemetry:

1. Touch ADMIT key within the desired tile.
2. Touch OK to confirm admission.
3. Touch item to be entered to place cursor or use TAB key to move between fields.
4. Enter information using on-screen keyboard or computer keyboard.
5. Confirm that the correct CHANNEL number matches the channel displayed within the selected patient tile.
6. Check for correct patient information.

Bedside Monitor:

1. Turn on the bedside monitor. Once the bedside monitor is turned on, the associated window on the CNS screen will become active.
2. Touch ADMIT on the appropriate tile with the patient's room number.
3. Touch the grey ADMIT key at top of screen.
4. Touch OK to confirm admission.
5. Enter the patient's name and other pertinent information as necessary.

Change Patient Information

1. Touch the (») of the appropriate patient window on the ALL BEDS screen.
2. Touch the ADMIT/DISCHARGE key.
3. Touch the field for the item to be entered/changed.
4. Enter the information using the on-screen keyboard or computer keyboard.

Readmitting a Discharged Patient

Data for up to 300 patients can be saved as patients who can be readmitted. If more than 300 patients are discharged within 120 hours, the oldest patient data is deleted.

1. Touch ADMIT on the ALL BEDS screen to display the ADMIT/DISCHARGE window.
2. Touch READMIT to display the discharged patient list window.**
**The discharged date and time, patient ID, patient name and physician of the patient who was discharged within the past 120 hours are displayed if entered prior to discharge.
3. Touch the data of the patient to readmit.
4. The patient information entered before discharge of the selected patient is displayed. Confirm the information and touch ADMIT. A confirmation window appears. To cancel readmitting, touch CANCEL.
5. After confirming the message, touch OK. The patient is readmitted and monitoring starts.

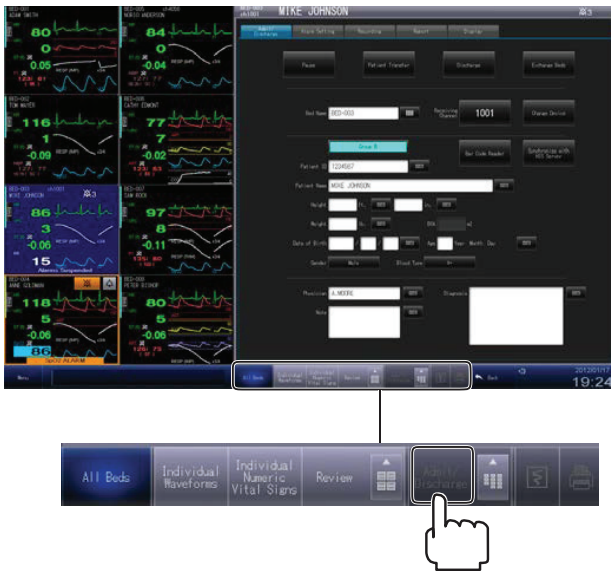
Change Monitoring Device in Patient Window

(i.e. Bedside monitor to transmitter)

The CHANGE DEVICE function allows you to monitor your patient from either a bedside monitor or a transmitter in the same window on the CNS, and to have the data stored into a single record.

To perform the CHANGE DEVICE procedure, ensure that the bedside monitor is TURNED ON then:

1. Touch the appropriate patient window on the ALL BEDS screen.



2. Touch ADMIT/DISCHARGE to display the ADMIT/DISCHARGE window.
3. Touch CHANGE DEVICE to display the change device window.
4. Select a group. The registered beds of the group are displayed.
5. Select the new monitor.
6. Touch CHANGE DEVICE. The window to confirm the change appears.
7. Touch YES on the confirmation window.
8. After the monitors are changed, a "CHANGE DEVICE: SUCCESS" message appears. Touch OK. The patient is automatically admitted on the new monitor.

Pause Monitoring

The PAUSE function pauses the displaying of measurement values and alarm function without losing patient information and settings. While monitoring is paused, a pause reason is displayed beside the paused bed on the central monitor screen. You can select the reason from preset customizable reasons.

Telemetry:

1. Touch the data area of the bed for which you are going to pause monitoring.
2. Touch the ADMIT/DISCHARGE key at bottom of screen.
3. Touch the PAUSE tab.
4. Touch, for example, the X-RAY button, to select X-RAY as the message to be displayed during the pause in monitoring.
5. Touch the PAUSE key.

*Monitoring resumes automatically when the patient is reconnected to the transmitter upon return to the unit**

* The criteria for resume monitoring are listed below:

- HR continuously monitored for the selected time (all leads must be attached).
- SpO₂ is continuously monitored for the selected time.
- PR from the IBP (ART, ART2, RAD, DORS, AO, FEM, UA, LVP, or P1-8) is continuously monitored for the selected time.
- NIBP is properly measured and the SYS, DIA or MAP value is displayed.
- Asystole is generated.

Bedside Monitor:

Suspend patient from bedside monitor.

Press MENU > SUSPEND MONITORING.

Use telemetry procedure to place label on CNS, if desired.

Monitoring resumes when the patient is reconnected to the monitor (see note above for criteria).

Patient Transfer**

(from one Nihon Kohden central monitor to another)

***When transferring a patient, confirm the destination bed you want to transfer by the message on the screen. If you select the wrong destination bed, the patient data of the source bed will be overwritten and that patient will be discharged. Data may or may not be recovered depending on CNS software version.*

1. Touch the appropriate patient window on the ALL BEDS screen.
2. Touch the ADMIT/DISCHARGE key at bottom of screen.
3. Touch the PATIENT TRANSFER tab.
 1. Select a destination group. The registered beds of the group are displayed.
 2. Select the destination bed the patient will be transferred to.
 3. Touch TRANSFER key. The confirm window appears.

A pop-up window will appear, asking you to confirm the bed transfer. **Touch YES if you are certain that this bed is empty and is the correct location for the patient's information to be transferred to. Any current data will be overwritten and cannot be recovered once this process is completed. After patient transfer, a "TRANSFER: SUCCESS" message appears.**

4. Touch OK. The source bed is discharged and the patient is admitted to the destination bed.

Patient Discharge

Telemetry:

1. Touch appropriate patient window on ALL BEDS screen.
2. Touch ADMIT/DISCHARGE key at bottom of screen.
3. Touch DISCHARGE tab (label may vary by unit). The window to confirm appears.
4. Touch OK key.

Bedside Monitor:

Follow telemetry procedure to discharge from CNS

OR

Patient may be discharged from bedside monitor.

Alarm Icons

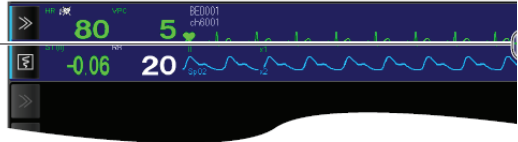
Alarm Notice Icon



Technical Icons

ECG technical icon

When the technical icon is touched, the Alarm Event window of the bed is displayed.



SpO₂ technical icon



Change Vital Signs and Arrhythmia Alarms

* Change Vital Signs Alarms:

1. Touch the (») on the appropriate patient on the ALL BEDS screen.
2. Touch the ADMIT/DISCHARGE key.
3. Touch ALARM LIMITS key.
4. Touch the appropriate parameter key (i.e. HR) displayed on screen.
5. Touch the high or low value to change.
6. Touch ▲ to increase value or ▼ to decrease value.
7. Touch (X) to close the window.

* Change Arrhythmia Alarms:

1. Touch the (») on the appropriate patient on the ALL BEDS screen
2. Touch the ADMIT/DISCHARGE key
3. Touch the ARRHYTHMIA ALARM key
4. Touch the appropriate arrhythmia alarm to ON or OFF or set the detection condition.
5. When a detection condition is touched, the setting window is displayed.
 - a. Touch ▲ to increase value or ▼ to decrease value.

*** Individual patient alarm settings can also be changed in the Vital Signs Alarm or Arrhythmia Alarm menus in the MAIN MENU**


Atrial Fibrillation Alarm

An atrial fibrillation (A-Fib) alarm is available for A-Fib lasting longer than two minutes. If a patient enters an episode of A-Fib, the monitor will initially indicate "Irregular RR", then the monitor will alarm for A-Fib after about two minutes and show A-Fib on the monitor. When a patient converts to normal sinus rhythm (NSR) that lasts longer than two minutes, the End A-Fib alarm will activate (an additional delay may be set by your administrator). Consult with your Nihon Kohden representative for further network requirements.

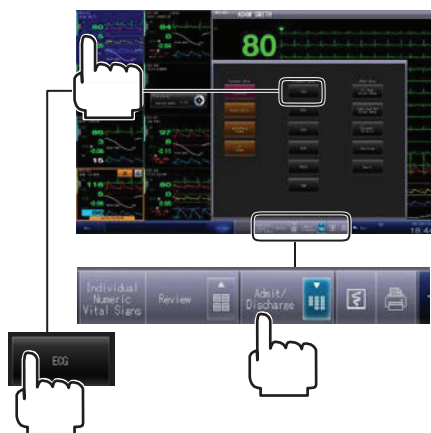
Adjust Alarm Volume

1. Touch MENU on the left lower corner of the screen → SYSTEM SETUP to display the Information window of the System Setup screen.
2. Touch the SOUND CONTROL tab at the top of the screen.
3. Touch ▲ to increase or ▼ to decrease alarm volume.

Change ECG Settings

1. Touch appropriate patient on All Beds screen.
2. Touch () to display the Setup Menu.
3. Touch the ECG parameter key under Parameter Setup to display the setting window for the parameter **OR**

On the Individual Bed window, touch the parameter you want to display the setting window for.



Change ECG Lead:

For Bedside Monitor:

ECG and arrhythmia analysis is performed on the top lead on the bedside monitor. Change ECG lead(s) at the bedside monitor.

For telemetry:

ECG and arrhythmia processing is done on the selected lead. Single or Multi lead analysis is available.

1. Touch ARRHYTHMIA ANALYSIS SETTINGS key, then choose the lead(s) to monitor/view.
2. Choose desired analysis type SINGLE/MULTI.
3. QRS Detection can be selected for Adult/Child/Neonate in the QRS Detection tab.

Detect Pacing

1. Touch OTHER key on main ECG Window.
2. Touch ON under PACING DETECTION.
3. Touch ON under PACING MARK section to show enhanced spike on detected paced beats.

Auto Lead Change (to continue monitoring for “electrode off” conditions - leads I, II, III)

1. Touch OTHER key on main ECG Window.
2. Touch ON or OFF under AUTO LEAD CHANGE.

Change Waveform Size (visual only)

1. Follow CHANGE ECG SETTINGS directions.
2. Touch desired waveform to change sensitivity.
3. Touch desired sensitivity.
4. Touch (X) in upper right corner to close window.

Change Arrhythmia Detection Lead

1. Follow CHANGE ECG SETTINGS directions.
2. Touch ARRHYTHMIA ANALYSIS SETTINGS.
3. Touch desired lead to detect arrhythmias from.

The HUM filter is an electrical filter that is used to improve the look of the telemetry ECG tracing by reducing AC baseline noise. See the TELEMETRY TROUBLESHOOTING section in this guide for more information.

See “Change Vital Signs Alarms” in this guide for alarm settings.

View All Leads of ECG

Eight leads of ECG can be displayed with a 6-electrode lead set.

1. Touch appropriate patient file.
2. Touch INDIVIDUAL WAVEFORMS window.
3. Touch ECG 12 LEAD

OR

1. Touch the (») on the appropriate patient on the ALL BEDS screen.
2. Touch ECG 12 LEAD.

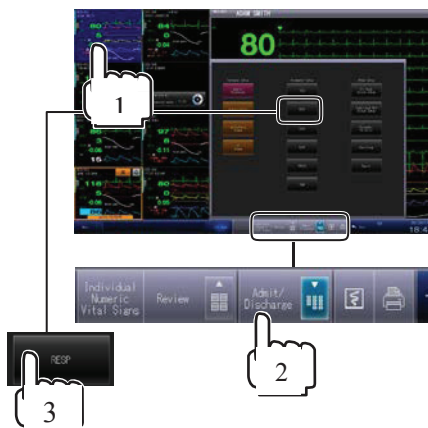
If only using a 3 electrode lead set, only 1 lead will be displayed. If using a 6 electrode lead set or a 10 electrode lead set on the BSM, 8 or 12 leads will be displayed respectively.

Respiration Monitoring (from RA&LL ECG electrodes)

See "Change Vital Signs Alarms" in this guide for alarm settings.

For Bedside monitors:

Respiration controls are performed at the bedside. See Quick Reference Guide for the BSM. Alarm parameters may be changed in the CNS.



To activate or deactivate respiration/apnea monitoring for telemetry:

1. Touch the appropriate patient on the ALL BEDS screen.
2. On the Setup Menu of the Individual Bed window, touch RESP to display the RESP window.
3. Touch the OTHER key.
4. Choose ON or OFF.

To improve respiration detection:

1. Ensure that the LL electrode is fresh and positioned at the anterior axillary line on the left lower rib. Do not place it on the abdomen, as the monitor cannot sense the changes in the chest from this location.
2. Increase the RESP SENSITIVITY.

For telemetry:

1. Touch the appropriate patient on the ALL BEDS screen.
2. On the Setup Menu of the Individual Bed window, touch RESP to display the RESP window.
3. Touch the RESPIRATORY WAVEFORM.
4. Choose desired higher sensitivity (X1, X2 etc.) This is visual only.

SpO₂ Monitoring

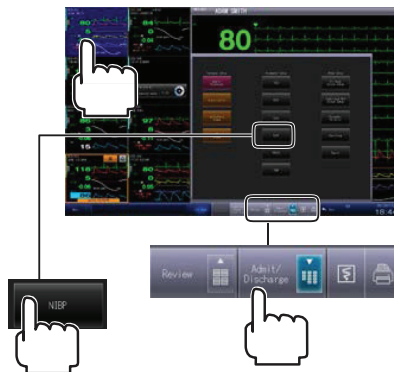
To activate or deactivate SpO₂ monitoring, insert or remove the SpO₂ probe from the transmitter or the bedside monitor, then silence alarm.

To change the SENSITIVITY of SpO₂ waveform:

1. On the Setup Menu of the Individual Bed window, touch SpO₂ to display the SpO₂ window.
2. Touch the SpO₂ WAVEFORM to change the sensitivity.
3. Select the desired sensitivity (X1, X2, etc.) (Visual only).

NIBP Monitoring

To initiate NIBP monitoring, ensure that the cuff is on the patient's arm, and then activate the readings using the bedside monitor or the NTX transmitter. Remote readings can be generated from the CNS for the bedside monitor **ONLY**.




1. On the Setup Menu of the Individual Bed window, touch NIBP to display the NIBP window.
2. Touch NIBP MEASUREMENT key.
3. Touch START key.
4. Touch YES to generate a single reading or to activate an interval.
5. Touch ALL BEDS to exit.

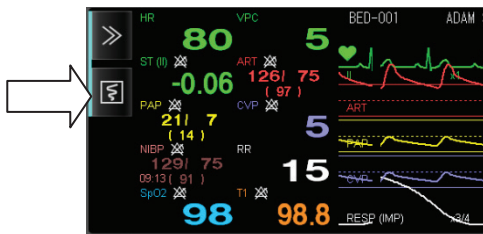
See “Change Vital Signs Alarms” in this guide for alarm settings.


Adjust Recordings


Individual, Shift, and up to 3 Waveform/Rhythm Strips

For strip recordings of real-time data, do one of the following:

- To record an individual patient strip, touch the () key next to the desired patient window.




- To record shift strips for all patients on the CNS, touch the RECORD ALL key at the bottom of the ALL BEDS screen.
- To record up to 3 waveforms on strips:
 - Touch the appropriate patient window on the ALL BEDS screen.
 - Touch the () key at the side or bottom of the screen to START or STOP recordings.
 - (Recording pattern must be set in RECORDING menu)
**see below

Touch () key on screen to send screen recordings to laser printer, if applicable. All displayed waveforms and numeric data on the individual bed window are printed on one page by the laser printer.

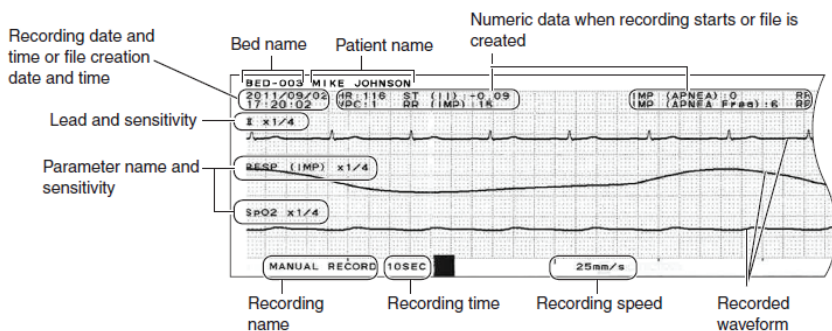
To enter the RECORDING SETUP menu:

Touch appropriate patient window.


Touch RECORDING of the Setup window.

1. Select recording parameters (first wave to third wave) on the RECORD WAVE SELECTION. When NONE is selected, no waveform is recorded.
2. Set the waveform sweep speed (25 mm/s, 50 mm/s) on RECORDING SWEEP SPEED.
3. Touch (X) to return to Individual Patient Window screen
4. Touch () to record strip.


WS-960P Recorder Unit



Enable/Disable Vital Sign Alarm Recordings (SpO₂/NIBP, etc.)

1. Touch appropriate patient window.
2. On Setup Menu (), touch RECORDING, then touch ALARM RECORDING.
3. Set ALARM LIMITS RECORDING to ON or OFF.

Disable Arrhythmia Alarm Recordings

1. Touch appropriate patient window.
2. On Setup Menu (), touch RECORDING, then touch ALARM RECORDING.
3. Set ARRHYTHMIA RECORDING to ON or OFF.

Enable Nurse Call Recordings (From telemetry transmitter)

1. Touch ALARM RECORDING then CALL RECORDING, and touch ON.

Review Stored Patient Data


The REVIEW window displays the vital sign data of one bed that is selected from the monitored beds. There are ten types of review windows. Two review windows can be displayed together on the same window.

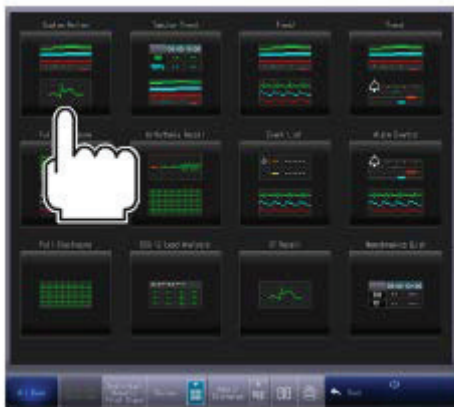
When you change to a different review window, the same time of review data is shown on the new window.

The monitor stores 1,500 arrhythmia events, 120 hours of Full Disclosure and trends, 120 hrs of ST files, 200 12-lead ECG's, 256 Hemodynamic calculations and 120 hrs of alarm histories on each patient.

****To print on laser printer, touch () key at bottom of any REVIEW screen****

Displaying the Review Window

1. On the ALL BEDS screen, touch the data area of the bed you want to display.
2. Touch () to display the REVIEW menu.



3. Touch the desired review window to view.

* Displayed when the monitored bed is a transmitter.
 Bed name
BED-001
 Receiving channel*
ch4057

Transmitter battery status icon
 Refer to Section 6.

Display pattern name
 Displayed when the display pattern is Custom Review. When the display pattern name is touched, a keyboard to change the name appears.
Note
 Refer to Section 4.

Patient name
ADAM SMITH



Alarm icon [X] Appears on a bed when an alarm occurs. Touch to silence the alarm.
 Alarm icon [A] Appears on a bed when an alarm occurs if the [Alarm Notice Icon] is set to [ON]. Touch to display the Event List window. The alarm notice icon remains until it is touched. Refer to Section 5.

Changes the window to full size.
 Displayed when there are two review windows. Touch [] to restore a full size display to two window split display.
 Displays each review window.
 Changes the display pattern.
 Displays each setting window.

Registers a comment. Refer to later in this section.
 Displays the review window.

Event List Window

The EVENT LIST window displays the latest 120 hours of events on the monitored beds. The most recent 10,000 files can be saved for each bed.

1. Touch appropriate patient on ALL BEDS screen.
2. Touch () to display the REVIEW MENU.
3. Touch EVENT LIST.
4. Touch () to display the setting window and select the event type.
 - a. To expand an event, touch it.
 - b. When the arrhythmia recall waveform is displayed on the arrhythmia alarm, the waveform can be expanded by touching the waveform.

The following events can be displayed in the event list:

- **Arrhythmia:** Arrhythmia alarms
- **Limit:** Upper and lower limits and ST alarms
- **Technical:** Technical alarms
- **System:** System alarms
- **Comment:** Comments
- **Caliper:** Caliper measurements

Sort
Touch to sort the list.
• Date/Time: Sort by date and time of file creation.
• Event: Sort by arrhythmia name.

Sort
Touch to sort the list by check mark on or off.

Displayed Arrhythmia

Measured waveform

QRS annotation

Check box
Touch to check the file to record/print or delete. Touch again to deselect the file.

Arrhythmia recall waveform
Displays expanded waveform window by touching the waveform when [ALL] is set to [List Display].

Date/Time
2013/09/14
08:55:04


Event
MPC RUN

Arrhythmia name

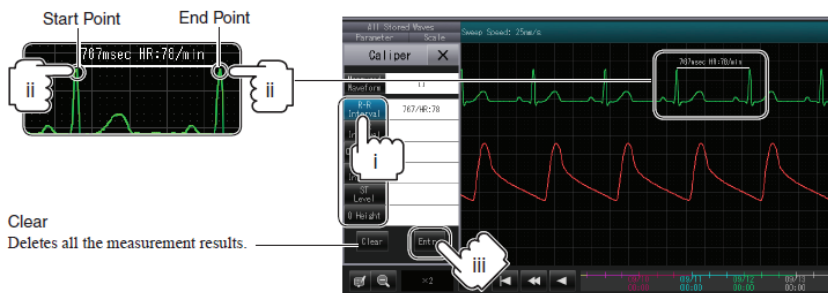
[ALL]

Touch to display the setting window and set the displayed arrhythmia types. [ALL] selects or deselects all files.

To Measure Intervals

1. Touch () key and then touch CALIPER MEASUREMENT on the expanded waveform window (measurements will PRINT separately on laser printer sheets and recordings).
2. Touch MEASURED WAVEFORM and touch the parameter waveform to measure.
3. Measure the waveform.

Example: Measuring R-R of the ECG (II leads)








- a. Touch the measure button to the left that you want to measure (R-R, PR, etc.)
 - b. Touch (or click with mouse) two measurement points on waveform
 - c. Repeat for all measures
 - d. To register the measurement results to the event list, touch ENTRY.
4. To return to the event list, touch the display.

To view displayed event in full disclosure format, touch FULL DISCLOSURE tab in middle of screen.


Arrhythmia Recall

The ARRHYTHMIA RECALL window displays the list of user selected arrhythmia recall files. The arrhythmia recall files are created for the most recent 1,500 arrhythmias for each bed.

1. Touch appropriate patient on ALL BEDS screen.
2. Touch () to display the REVIEW MENU.
3. Touch ARRHYTHMIA RECALL.
4. Touch () to display the setting window and set the displayed arrhythmia types. ALL selects or deselects all files.
5. To delete multiple events on the arrhythmia list, touch the () button for each event, then touch the DELETE key.
6. To print multiple events on the arrhythmia list to laser printer, touch the () button for each event. Then touch the () key (prints four events to a page).

Full Disclosure Waveforms

The central monitor saves 120 hour full disclosure waveforms for up to 16 parameters for each bed. You can select the displayed full disclosure waveforms from the stored parameters.


1. On the ALL BEDS screen, touch the data area of the bed you want to display.
2. Touch () to display the Review Menu.
3. Touch FULL DISCLOSURE window.
4. To scroll through time, touch ◀◀ and ▶▶ buttons.
5. For page-by-page scan, touch Automatic Scroll ON key then ◀◀ or ▶▶.
6. To expand an area for review, touch desired waveform area.
7. To change waveform size or scale, touch waveform SCALE key and choose desired sensitivity.

To Create a Manual Strip*

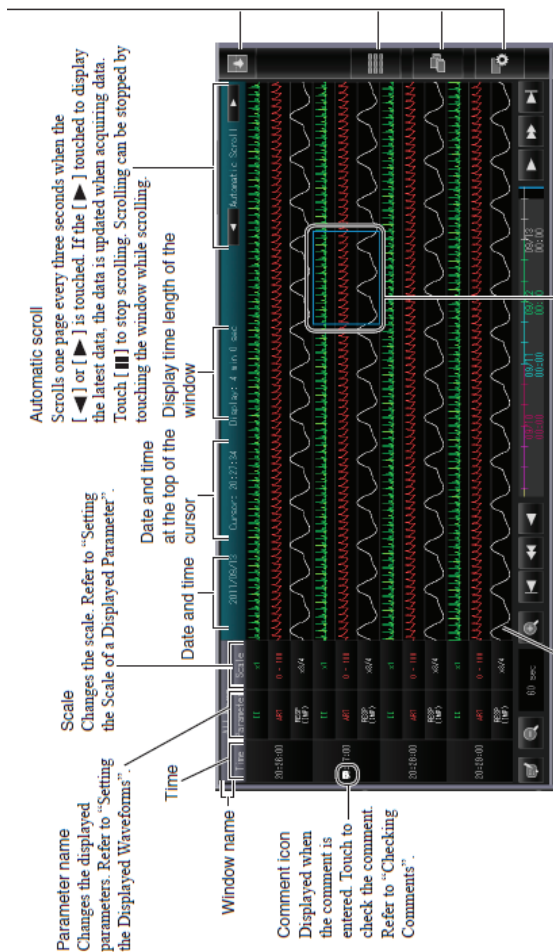
1. Touch FULL DISCLOSURE window.
2. To scroll through time, touch ◀◀ and ▶▶ buttons.
3. Touch desired waveform to manually create and store.
4. Touch SELECTED WAVE and choose appropriate wave.
5. Touch OK.

*Manual strip will be stored in ARRHYTHMIA RECALL

To Send a Stored ECG Strip to EMR




1. Touch ARRHYTHMIA RECALL window
2. Select 1 or up to 150 arrhythmia recall strips at a time to send to EMR by touching the () button on each corresponding waveform.
3. To view and select manually created strips, please ensure that the MANUAL is selected on the filter.
4. Once checked, touch SEND to EMR button.
5. Touch OK.
6. Confirm.

7.



Vital Signs Trends (HR, VPC/min, ST, Resp, etc.)

The TABULAR TREND window displays measured parameter values of the most recent 120 hours as a tabular trend. There are five tabular trend windows (Vital Sign 1 to 4 and NIBP).

1. On the ALL BEDS screen, touch the data area of the bed you want to display.
2. Touch () to display the REVIEW MENU.
3. Touch TABULAR TREND window.
 - a. To change the display interval, touch () or () on the bottom left of the screen.
 - b. To change displayed values, touch the parameter name and the parameter setting window appears.
 - c. Select the new parameter by either selecting or deselecting it. Touch (X) to exit window.

Hemodynamics List

The HEMODYNAMICS LIST window displays hemodynamics parameter values registered on the CO measurement window, blood pressure values entry window and hemodynamics parameters which are automatically registered at the CCO measurement on the bedside monitor.

Display the HEMODYNAMICS LIST window and touch () to print.

Additional System Setup Functions

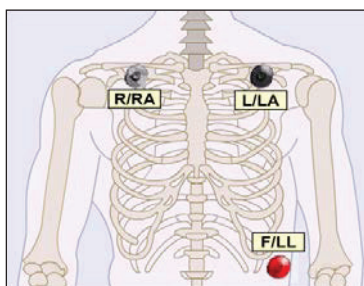
Touchscreen Setting: Utilize when cursor location is inappropriate.

1. Touch MENU in the lower left corner of the screen.
2. Select TOUCHKEYS SETTINGS tab.
3. Touch CALIBRATE TOUCH SCREEN box in center of screen.
4. Touch the three bull's eyes as they appear on the screen.
5. Touch the green check mark.
6. Press ALL BEDS when calibration complete to return to main screen.

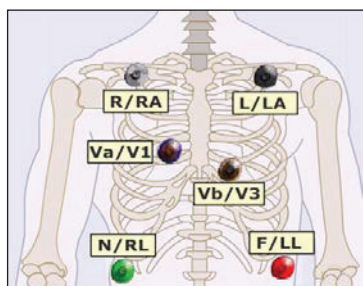
Skin Prep/Electrode Handling

The AACN Bedside Cardiac Monitoring Protocol recommends the following procedures to obtain the best ECG tracing. These steps will minimize motion artifact and false arrhythmia interpretation by the monitor.

1. Select electrode sites according to electrode placement diagram.
2. Clip or trim excess hair prior to electrode placement.
3. Gently abrade skin with dry gauze to remove dead cells.
4. Clean skin with soap and water, if necessary.
5. Attach lead-wire to electrode.
6. Attach electrode to patient, pressing edge of electrode to secure Position ECG cables to prevent tangling.
7. Change electrodes every 24-48 hours or according to manufacturer's recommendations.
8. Use stress loops as necessary to prevent interference from lead wire movement.



3-lead wire Electrode Placement



6-lead wire Electrode Placement

3 Electrode Telemetry Cable

To view different leads using the three electrode cable on the telemetry transmitter:

Lead I	Position
White (-)	(RA) Right chest under the clavicle
Black (N)	(LL) Left anterior-axillary line edge of rib.
Red (+)	(LA) Left chest under the clavicle
Lead II	Position
White (-)	Right chest under the clavicle
Black (N)	Left chest under the clavicle
Red (+)	Left anterior-axillary line at edge of lower rib.
Lead III	Position
White (-)	Left chest under the clavicle
Black (N)	Right chest under the clavicle
Red (+)	Left anterior-axillary line at edge of lower rib.
MCL I	Position
White (-)	Left chest under the clavicle
Black (N)	Right chest under the clavicle
Red (+)	4th intercostals space, right sternal border

Once electrodes are repositioned on the patient, change the lead name in ECG>Lead Name menu.

6 Electrode Cable	
Limb Lead	Position
White (-)	Right chest under the middle of clavicle
Black	Left chest under the middle of clavicle
Green	Right anterior-axillary line, edge of lower rib
Red (+) Lead II	Left anterior-axillary line at edge of lower rib. Position higher and more anterior for RESP monitoring.
Chest Lead	Position options for C-a and C-b electrodes
*V 1 Blue	4th ICS, RSB
V 2	4 th ICS, LSB
*V 3 Orange	Halfway between V2 and V4
V 4	5th ICS, left mid-clavicular line
V 5	Anterior axillary line at same level as V4
V 6	Mid-axillary line at same level
*Recommended default V-leads	

Telemetry ECG Troubleshooting Techniques

Note for Bedside Monitoring: *The interventions in this section apply to telemetry monitoring. When using a bedside monitor, ECG and arrhythmia processing occur in that monitor. All ECG and arrhythmia troubleshooting is performed on the patient (fresh electrodes, good skin preparation and proper electrode placement) and bedside monitor.*

Undercounted Heart Rate/False Asystole Alarms/ Low mV Message

If the R wave amplitude for your patient is less than 0.5 mV (one large box on the ECG paper), the monitor may:

1. Undercount the heart rate (QRS complex is too small to detect).
2. Alarm falsely for asystole (QRS complex is too small to detect).
3. Give a low mV Message (QRS complex is too small to detect).

To correct this with the six-electrode lead set, view all leads of ECG, then:

1. Ensure that the electrodes are fresh and placed correctly, then assess all ECG leads (Touch the patient's waveform then the ECG 12 LEAD DISPLAY tab).
2. Identify a lead that provides a smaller P or T wave (the QRS complex must be more than double the size of the P or T wave) then monitor that lead for analysis (ECG > ARRHYTHMIA ANALYSIS).
3. Relearn the ECG (ECG>Main and then touch LEARN ECG).
4. Turn off the second analysis lead (ECG > ARRHYTHMIA ANALYSIS > SINGLE).
5. If the monitor sees a tall, narrow QRS as a pacer spike, it may be alarming because it does not see a subsequent QRS: (ECG > OTHER SETTINGS > PACING DETECTION > OFF).

With the three-electrode set:

1. Ensure fresh electrodes.
2. Ensure that LL (red) is on anterior axillary line at the lower rib.

Double-Counted Heart Rate

If the monitor is double-counting your patient's heart rate, a possible cause is a large P or T wave is being counted as a QRS complex.

To correct this problem with a six-electrode set:

1. Ensure that the electrodes are fresh and placed correctly, then assess all ECG leads (Touch the patient's waveform then select FULL DISCLOSURE REVIEW tab).
2. Identify a lead that provides a smaller P or T wave (the QRS complex must be more than double the size of the P or T wave) then monitor that lead for analysis (ECG > ARRHYTHMIA ANALYSIS).
3. Turn off the second analysis lead (ECG > ARRHYTHMIA ANALYSIS > SINGLE).
4. Have the monitor relearn the patient's ECG (Touch on the appropriate patient on the All Beds Screen and then touch the HR parameter. Touch LEARN ECG).

It also may be necessary to reposition the electrodes on the patient.

With the three-electrode set:

1. Ensure fresh electrodes.
2. Ensure that left leg electrode (red) is placed on anterior auxiliary line at the lower rib.
3. Relearn the ECG (Touch on the appropriate patient on the All Beds Screen and then touch the HR parameter. Touch LEARN ECG).

Ventricular Alarms for Normal Rhythms

If the monitor is giving ventricular alarms for normal rhythms, a possible cause is the patient's QRS complex has changed from the learned "dominant" complex.

To correct this problem:

1. Ensure that the electrodes are fresh and placed correctly and that the ECG tracing is "clean", then
2. Relearn the ECG (Touch on the appropriate patient on the ALL BEDS Screen and then touch the HR parameter. Touch LEARN ECG).

Arrhythmias Not Alarmed

If the monitor is not alarming for arrhythmias, possible causes include:

1. Noise or artifact is interfering with arrhythmia detection
2. ARRHYTHMIA ANALYSIS is turned OFF
3. The relevant individual alarm is turned OFF

The corresponding solutions are:

1. Correct the problem that is causing the noise (the monitor suspends arrhythmia monitoring during continuous noise situations).
2. Turn ARRHYTHMIA ANALYSIS to ON (ECG > ARRHYTHMIA ANALYSIS Setting)
3. Turn the appropriate alarm ON (ECG > ARRHYTHMIA ALARM)
4. Relearn the ECG (Touch on the appropriate patient on the All Beds Screen and then touch the HR parameter. Touch LEARN ECG)

False Alarms for Movement and Artifact

If the monitor is giving false tachycardia, V-tach, or V-fib alarms for movement or artifact, possible causes include:

1. Electrodes are not fresh and secure
2. Electrodes are not placed correctly
3. Lead wires are not secured with stress loops
4. Transmitter is not stabilized in patient pocket or pouch

The corresponding solutions are:

1. Change electrodes according to electrode manufacturer recommendations, or every 24-48 hours
2. Place electrodes between bones and clear of large muscles
3. Secure lead wires with stress loops, if necessary to prevent wire from moving on electrode
4. Secure transmitter in pocket or pouch to prevent movement
5. Relearn the ECG (Touch on the appropriate patient on the All Beds Screen and then touch the HR parameter. Touch LEARN ECG)

Arrhythmia Alarms Not Stored

If the monitor is not storing arrhythmia alarms, possible causes include:

1. ARRHYTHMIA ANALYSIS is turned OFF.
2. ARRHYTHMIA RECALL is turned OFF.

The corresponding solutions are:

1. Turn ARRHYTHMIA ANALYSIS to ON (ECG > ARRHYTHMIA ANALYSIS SETTING).
2. Select ARRHYTHMIA RECALL REVIEW and then select CREATE RECALL WAVEFORM to choose events to be stored.

Difficulty Monitoring Paced Rhythm

If you are having trouble monitoring a paced rhythm, possible causes include:

1. PACING DETECTION is turned OFF.
2. The pacer spike is too small and the monitor is unable to detect it.
3. The pacer spike is too large and the monitor is calling asystole.

The corresponding solutions are:

1. If pacing detection is turned OFF:
 - a. Turn PACING DETECTION to ON (ECG main window > OTHER SETTINGS).
2. If the pacer spike is too small try one or more of the following:
 - a. Turn HUM FILTER to OFF (ECG > OTHER SETTINGS).
 - b. Monitor a single lead, such as V1 (or MCL1 with the three electrode set), or a lead that displays a larger pacer spike (ECG > ARRHYTHMIA ANALYSIS SETTING).
 - c. Choose single lead analysis (ECG > LEAD SELECT)
 - d. Reposition the RA electrode lower and the LL electrode higher on the chest
3. If the pacer spike is too large:
 - a. Monitor a lead that displays a pacer spike smaller than the QRS at X1 sensitivity such as V1 (or MCL1 with the three electrode set) (ECG > ARRHYTHMIA ANALYSIS SETTING).

Pacing Marker

The pacing marker is a visual enhancement that the monitor places onto the pacer spike when it detects it. This function has no effect the pacing detection, but provides for better visualization of the beats that the monitor is detecting. (ECG main window > OTHER SETTINGS).

It may be necessary to turn this function to OFF if the monitor is detecting extraneous electrical activity, such as a dialysis machine.

V-Lead Placement

The CNS software allows you to change the label for your Va and Vb choices when you change the chest lead positions on the patient from the standard V1 and V3 when using a 6 lead (ECG > OTHER). Choose the correct lead to monitor in ECG > ARRHYTHMIA ANALYSIS SETTING menu. The nursing literature recommends placing the:

1. First brown snap lead wire in V1 – brown with **blue** stripe (Va) (4th intercostals space, right sternal border) for arrhythmia monitoring.
2. Second brown snap lead wire in V3 – brown with **orange** stripe (Vb) (left of sternum between V2 and V4) for anterior wall ST monitoring.
3. Clip lead wires are labeled as Va (blue) and Vb (orange).

V1 is also helpful for monitoring pacemaker patients.

A modified chest lead (MCL) can be used with the three electrode lead set (see electrode placement table in this guide).

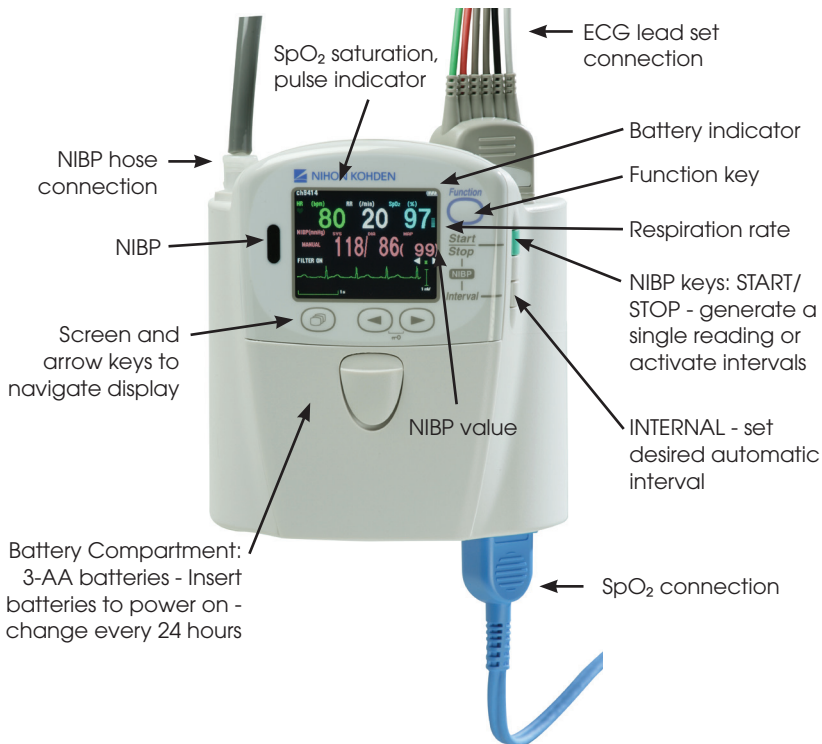
Cleaning and Disinfecting

Please consult the Operator's Manual or the Cleaning and Disinfecting Guide for a complete list of approved cleaning and disinfecting agents.

*The use of any other disinfectant solutions may cause damage to the equipment and may void the product warranty.

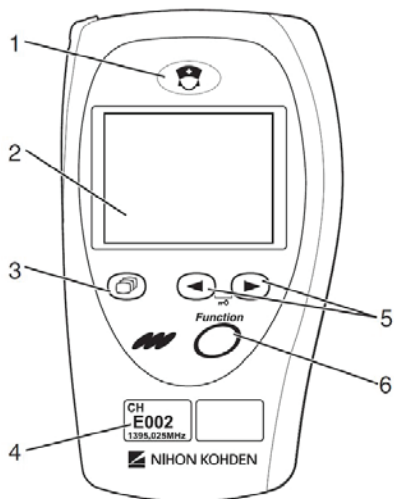
The NTX (ZM-540PA) - Multi-parameter Transmitter

The NTX transmitter will continuously monitor ECG/Respiration/SpO₂, and can register NIBP readings manually or automatically.



ZM-520PA and ZM-530PA Telemetry Transmitters

Front

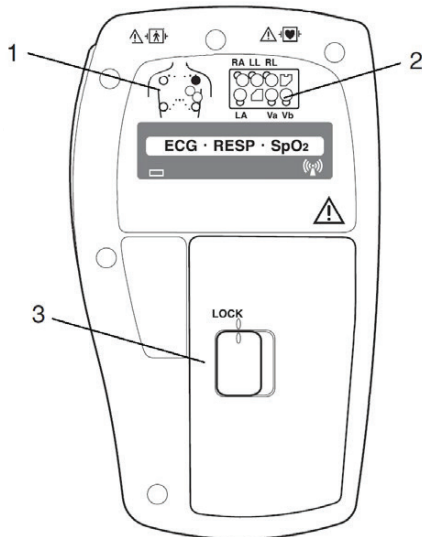


1. CALL/REMOTE RECORD key. Displays call message at the receiver and can be programmed to record ECG strip.
2. Display for numerics, waveforms and messages.
3. SCREEN SELECT key. Pressing this key turns the display on and changes the display screen.
4. Channel Number.
5. Lead/Scroll keys. Changes ECG lead or scrolls data depending on display screen.
6. FUNCTION Key. Depending on transmitter settings, this key can pause monitoring, suspend alarms or send "PATIENT CONFIRM" message.

Back

1. Electrode placement diagram.
2. Lead pin designation.
3. Battery compartment - 2 AA.

New batteries last 2-4 days.
Change with each patient and discard according to protocol.



For more information, please
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